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ABSTRACT

An important reaction to individuals involved in problem solving is detecting the accuracy of their responses. Prior research has established that young adults are accurate in estimating correctness to responses on the Wechsler Adult Intelligence Scale (WAIS). These findings were extended to the elderly; also considered was whether ability-extraneous variables (e.g., fatigue) influence either accuracy in judging correctness, or IQ score. The WAIS was administered to 44 community dwelling elderly citizens in a counterbalanced manner to control for motivational influences. The examinees' IQs and estimations of correctness were measured. Materials included standard WAIS protocols and forms on which the examinees wrote a "+" or "-" after each response to indicate feelings of correctness ("+") or incorrectness ("-"). Older examinees were highly accurate in their feelings of correctness. Analyses of variance and covariance indicated order of presentation significantly influenced accuracy in reporting correctness. While IQ score was not affected by order of presentation, mean Performance IQ score was significantly lower than mean Verbal IQ score. Findings suggest that future research focus on the emotional reactions to both internal and artificial feedback. (Author)

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MOTIVATIONAL INFLUENCES OF ELDERLY TEST PERFORMANCE

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Motivational Influences on Elderly Test Performance

An important reaction to individuals involved in problem solving is detecting the accuracy of their responses. Over the years, researchers have hypothesized that subjects generally sense whether or not their answers are correct (Ross, 1933; Rust, Strang, and Bridgeman, 1977; Ward and Prytula, 1976). To substantiate this notion, a previous study by Rust and Oster (1977) demonstrated that young adults were highly accurate in their perceived estimates of correctness on both the WAIS and Stanford-Binet. The present study extends these findings to the elderly and also considers the influence of motivational effects on accuracy of perceived correctness.

Of central concern in studies which find a decline with age in Performance scores of the WAIS has been the issue of ability-extraneous variables (Botwinick, 1977, pp. 580-605). Rather than the lower Performance scores being the result of reduced ability, they may be a concommitant of non-intellectual factors such as fatigue. Furry and Baltes (1973) demonstrated that these situational variables possibly disrupt test scores of older individuals, thus confounding the interpretation of age comparisons. Recently, however, Cunningham, Sepkoski, and Opel (1978) found possible fatiguing effects in only one of five experimental conditions. While they concluded that fatigue could not explain a high percentage of the variance on intelligence tests, they noted that their results must be regarded as "tentative".

The WAIS was constructed for standard administration where all the Verbal Scale subtests would precede the Performance

Scale subtests (Wechsler, 1955). Therefore, the elderly client may be at a disadvantage due to fatigue, confusion or reduced interest by the time the Performance Scale is administered.

No research using the WAIS has ever controlled for order of presentation. A prior investigation using the Primary Mental Abilities Test demonstrated that order did not significantly influence IQ scores (Kamin, 1957). However, no attempt was made to measure whether order of administration influenced the clients' reaction to taking the test. The present study ascertained these reactions to test taking by assessing perceptions of correctness after each item. In addition, the possible influence of fatigue effects was controlled by counterbalancing the order of presentation of the WAIS tests. The Performance Scale was administered initially on one-half of the protocols.

Method

Subjects

The WAIS was administered to a sample of elderly subjects, ages 65 and older. The sample consisted of 44 volunteers, 22 men and 22 women who were either residents of an apartment complex for senior citizens or members of a senior citizen center in Tennessee. The volunteers were all community dwelling, self-sufficient, and relatively healthy. The ages of the male volunteers ranged from 66 to 95 (M=76.59, SD=7.36), while the ages of the female volunteers ranged from 66 to 92 (M=74.64, SD=6.71). The educational level ranged from one year of school to nineteen years.

Instruments and Procedures

In order to control for possible motivational effects, the

subjects were randomly divided into two groups consisting of an even number of both sexes: 22 persons were administered the WAIS Performance Scale first; while 22 were given the standard administration of the WAIS, beginning with the Verbal subtests. With the exception of the counterbalanced approach for half the subjects, all 44 subjects were administered the WAIS in its entirety according to the WAIS manual instructions (Wechsler, 1955). All of the testing was conducted by the third author who was not aware of the hypotheses under investigation. All protocols were checked by liscensed psychologists.

Before testing began each subject was presented a form for measuring the accuracy of feelings of correctness. The form consisted of a blank for each item of the WAIS, along with the following instructions: "Please make a minus (-) beside each question that you think you got wrong and a plus (+) beside each one that you think you got right." Care was taken to be sure that each subject fully understood the instructions. The subject then made a response (+ or -) following the answer of each question. If the subjects seemed unsure of the correctness, they were asked to make their best guess rather than to leave it blank. During the testing the examiner recorded responses on a clipboard to be certain that the examinees could not detect scoring.

On the items of the test requiring timed responses, with the exception of Digit Symbol, the subjects were allowed to continue until finished. The total time was recorded. Items that exceeded the time limit, but were finished correctly, were

considered wrong (or partially correct in the case of Object Assembly) and did not count toward the IQ score; however, a notation was made indicating that the items were overtime but correct. When accuracy of judging correctness was measured, these items were considered to be correct.

Results

Perceptions of Correctness

Data were organized into the following categories according to accuracy of the examinees' rated correctness. Category 1 was indicated when an answer was correct and the examinee predicted that it was correct. For category 2 the answer was correct but the subject reported that it was incorrect. Category 3 was recorded when the response was incorrect but the examinee indicated that it was correct. Finally a category 4 response reflected an incorrect answer which the subject acknowledged as incorrect. Response categories 1 and 4 were indicative of accurate beliefs. Both one and two point responses on the WAIS were coded as correct.

The percentages of the responses in each category were converted into ranked data for each subject. The highest percentage was ranked one, and the lowest percentage was ranked four. For example, if a given subject had 70% in category 1, 10% in category 2, 5% in category 3, and 15% in category 4; then category 1 would be ranked first, category 4 ranked second, category 2 ranked third, and category 3 ranked fourth. The ranked data were tested with Friedman's two-way analysis by ranks (Spence, Cotton, Underwood, and Duncan, 1976) to test

for an abnormal proportions of the response categories. The Friedman's rank test was applied to the standard administration group, Performance-first administration group and the combined groups. Separate analyses were conducted for the Verbal Scale, Performance Scale as well as the Full Scale. Therefore, a total of nine Friedman's were conducted. The findings were significant for all instances at the .01 level of confidence indicating significant differences among the four categories. (Significance at the .01 level required a $\underline{X}_R^2 = 11.34$, $\underline{df}=3$; the smallest $\underline{X}_R^2$ of the nine computed was 47.53).

The percent figures for accurate perceptions of correctness (Categories one and four combined) were computed for each subject for the Verbal and Performance subtests. Three correlated $\underline{t}$ tests were used to compare accuracy of feelings of correctness on the Verbal and Performance scales. One $\underline{t}$ test was conducted for the standard administration group, one for the Performance-first group, and one for the combined groups. All three correlated $\underline{t}$ tests were significant beyond the .01 level of significance. (Standard administration $\underline{t}=4.01$, $\underline{df}=21$, $\underline{p} < .01$; Performance-first $\underline{t}=3.82$, $\underline{df}=21$, $\underline{p} < .01$; Combined groups $\underline{t}=5.6$, $\underline{df}=43$, $\underline{p} < .01$). In each instance the subjects were more accurate in their judgments of correctness for the Verbal Scale than for the Performance Scale.

The influence of fatigue on accuracy was measured by analysis of variance. A 2 x 2 analysis was conducted for standard vs. Performance-first order of administration and for the Verbal-Performance Scales. The percent accuracy of perceived correctness

was the dependent variable. Repeated measures were made on the second factor.

The mean percent accurate perceptions of correctness for the standard administration Verbal subtests was 81.62%, SD=8.14, and 74.45%, SD=12.02, for the Performance subtests. The mean percent accurate feelings of correctness for Performance-first administration Verbal subtests was 73.18%, SD=11.40, and 66.32%, SD=14.74, for the Performance subtests. The value of F was 6.22 (df=1,42, $p < .05$) for the administration variable. The value of F was 30.67 (df=1,42, $p < .01$) for Verbal-Performance. The interaction was not significant indicating that although order of administration reduced the accuracy of feelings of correctness, the reduction was consistent across the IQ scales.

IQ Score Analysis

A two (standard administration vs. Performance-first administration) by two (male-female) by two (Verbal IQ vs. Performance IQ) repeated measures analysis of variance was also conducted. The value for F was insignificant for order of administration and for sex. The value for F was significant at 5.80 (df=1,40, $p < .02$) for Verbal-Performance IQ. The mean Verbal IQ was 105.34, SD=16.52, and the mean Performance IQ was 102.27, SD=16.15. (These results have been previously reported, Rust, Barnard, and Oster, 1979).

Additionally a two (standard administration vs. Performance-first administration) by two (Verbal IQ vs. Performance IQ) analysis of covariance was computed with the examinees' education level being the covariate. The F value for order

of administration was not significant, while F for IQ scale was 5.84 (df=1,42, $p < .02$). The interaction failed to reach significance.

Significant correlations were found between the percentage of accurate feelings of correctness and the Verbal IQ, ($r=.75$, $p < .01$), Performance IQ, ($r=.73$, $p < .01$), Full Scale IQ, ($r=.76$, $p < .01$), years of education, ($r=.51$, $p < .01$), as well as ten of the subtest scale scores. The only subtest not related to accuracy of judged correctness at the .01 level was the Digit Span, which was significantly related to percentage accurate judgments at the .05 level. No significance was found between Full Scale IQ and age.

Discussion

Previous research had suggested that elderly test performance may be influenced by such ability-extraneous variables as fatigue. The present study attempted to control for these possible mediating effects by administering the Performance subtests of the WAIS first to half the subjects, while using the standard administration for the remaining half. The results showed that both groups performed significantly lower on the Performance subtests than on the Verbal subtests, but that fatigue did not significantly influence IQ. This finding provides additional support for the prior results discovered by Kamin (1957) and Cunningham, Sepkoski, and Opel, (1978). Although the hypothesis that fatigue causes IQ decrement in the standard administration was not supported, the results did demonstrate that order of administration does significantly effect

the percentage of accurate perceptions of correctness. It is apparent that the Performance-first subjects were less accurate in their judgments, especially on the Performance subtests.

Perhaps having to take the relatively difficult Performance Scale first shaped their emotional reaction for the entire test and caused them to inaccurately judge their correctness. Even though the subjects were more familiar with the subsequent Verbal subtests, overall accuracy in judging correctness was reduced. In contrast, the standard administration subjects began the test with the more familiar Verbal questions. Although the following Performance items became more difficult, precision was maintained and the subjects displayed more accuracy in judging correctness. The influence of order of administration on accuracy was also supported by behavioral observations made by the examiner (the third author). During the testing she observed what appeared to be a lack of confidence in the Performance-first administration subjects, in that they seemed to display more frustration and embarrassment when unable to perform a task. Additionally, the Performance-first group made a greater number of negative comments regarding the test than the comparison group.

The implications of these negative comments can be viewed within the context of an attributional model of achievement endeavors, as explicated by Weiner (1972, 1974). In an achievement-related situation, (e.g., intelligence test taking) causal ascriptions are generated by the examinee to provide reasons for ambiguous or negative feedback. The effects of such feedback

may be explained within the dimensions of an internal-external description of causes, and whether the expectation of future outcome remains stable (consistent) or unstable (transient). If an internal, stable attribution is made when confronted with missing a test item, the individual is likely to perceive this failure as the result of a lack of ability which would last throughout the testing session. In comparison, an external, unstable attribution would persist if an extraneous variable is blamed for the failure (e.g., lack of effort) which could be overcome during the remainder of the test.

In a prior study by Okun and Siegler (1977) it was found that older men do not attribute failure to a lack of effort, therefore they cannot anticipate future success after failure by planning to work harder. This result suggests that older men are more susceptible to blaming themselves for failing (i.e., generate internal attributions). In requiring one-half of the present subject population to perform a more difficult task initially, it is plausible to hypothesize that negative self-evaluations (lack of ability) could have resulted. In turn, this negative view of self could have produced an unpleasant emotion (i.e., anxiety) which subsequently could have disrupted confidence in estimating performance.

Three recommendations for assessing the elderly with the WAIS are offered: (1) follow Wechsler's standard administration so that success and confidence can be established with the Verbal Scale; (2) redirect negative self-statements from an internal source toward an external direction (e.g., "my

memory is failing" redirected to, "the test is difficult"); and (3) allow the subjects as long as they want to complete the timed items. It is recommended that future research focus on the elderly subjects' emotional reactions to both internal and artificial feedback. Such reactions may be quite different depending on the type and difficulty level of the test items.

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